OPTICAL STARK SPECTROSCOPY OF GOLD CHROLRIDE

RUOHAN ZHANG, TIMOTHY STEIMLE, *Department of Chemistry and Biochemistry, Arizona State University, Tempe, AZ, USA*.

The bonding and electrostatic properties of gold containing molecules are highly influenced by relativistic effects and electron correlation [a]. Hence it is difficult to predict those properties via electron structure calculation, and such calculation are guided by experimental observations. Here we report on the $A(\Omega = 1) - X^1\Sigma^+$ and $B(\Omega = 0) - X^1\Sigma^+$ bands of AuCl, which have been previously recorded at Doppler limited resolution [b]. A cold molecular beam sample was generated and the bands were recorded at high resolution (FWHM =35 MHz) using laser excitation spectroscopy, both field-free and in the presence of a static electric field. An improved set of spectroscopic parameters for the $A(\Omega = 1)$ and $B(\Omega = 0)$ states were obtained. The Stark induced shifts were analyzed to determine the permanent electric dipole moments for the X, A, and B states. A comparison with AuF [c] and theory will be made.

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[b] L. C. O'Brien, A. L. Elliott, and M. Dulick; *J. Mol. Spectrosc* **194** 124, 1999.

[c] T. C. Steimle, R. Zhang, C. Qin and T. D. Varberg; *J. Phys. Chem. A* **117(46)** 11739,2013.